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DIRECT TESTIMONY OF
STEPHEN E. SUMMER
ON BEHALF OF
SOUTH CAROLINA ELECTRIC & GAS COMPANY
DOCKET NO. 2008-196-E

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Stephen E. Summer. My business address is 6248 Bush
River Road, Columbia, South Carolina, 29212.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by SCANA Services, Inc. as a Senior Environmental
Specialist.

**Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL
BACKGROUND, PROFESSIONAL ASSOCIATIONS, AND
EXPERIENCE.**

I received my bachelor's degree in biology from the University of
South Carolina in 1973. I then was employed by the South Carolina
Department of Health and Environmental Control. I returned to school and
received a master's degree in wildlife biology from Clemson University in
1978.

1 I began working at South Carolina Electric & Gas Company's
2 (SCE&G or Company) V.C. Summer Nuclear Station site (V.C. Summer
3 Site) in 1978 and have worked on environmental, natural resource, and
4 wildlife issues related to the Site continuously since that time. For
5 example, from 1998 to 2002 I served as the environmental lead for nuclear
6 license renewal for the currently operating nuclear plant at the Site (Unit 1)
7 with the U.S. Nuclear Regulatory Commission (NRC). I also provide
8 fisheries support for SCE&G's hydroelectric generating facilities for
9 Federal Energy Regulatory Commission (FERC) relicensing issues.
10 Further, I oversee and coordinate water issues related to cooling water at
11 Unit 1. I presently also serve as the Environmental Technical Lead for the
12 licensing of two additional nuclear plants at the V.C. Summer Site, which
13 are the subject of this proceeding.

14 I hold a state-issued freshwater fisheries scientific collection permit,
15 and have held this permit for over 15 years. I hold a National Marine
16 Fisheries Service-issued endangered species take permit for shortnose
17 sturgeon in the Santee Basin. I am also a member of the national and state
18 chapters of the American Fisheries Society.

19
20 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

21 A. The purpose of my testimony is to discuss the environmental
22 impacts of the construction and operation of two additional nuclear power

1 plants to be constructed at the existing V.C. Summer Nuclear Station site
2 near Jenkinsville in Fairfield County, South Carolina (Facility). I will
3 explain and discuss the comprehensive environmental analysis conducted to
4 evaluate and assess the environmental impacts of the Facility, the
5 environmental permitting and compliance of the Facility, and explain why
6 the V.C. Summer Site is the best choice for the location of the two
7 additional nuclear power plants.

8
9 **Q. WHAT IS THE FACILITY?**

10 A. The Facility will consist of two nuclear power plants, Units 2 and 3,
11 together producing approximately 2,234 megawatts of power. The Facility
12 will be co-located with an operating nuclear power plant, Unit 1, at
13 SCE&G's V.C. Summer Nuclear Station near Jenkinsville.

14
15 **Q. WHAT IS YOUR ROLE REGARDING THE PROPOSED**
16 **FACILITY?**

17 A. I provide environmental analysis and assessment for the Facility. I
18 currently provide environmental support for Unit 1, and have done so for
19 over 30 years. I will also provide environmental support for Units 2 and 3,
20 during construction and afterwards. My job includes assuming a lead role
21 in managing environmental issues, including interaction with regulatory
22 and resource agencies. SCE&G retained contractors to assemble and

1 compile a comprehensive environmental report (Environmental Report),
2 which has been submitted to the NRC, with copies provided to DHEC,
3 DNR, and the Commission. I assisted with and provided oversight for
4 significant portions of that work on behalf of the Company and served as a
5 liaison in that effort.

6 Another aspect of my role with Units 2 and 3 will be to duplicate my
7 role with Unit 1 of working to ensure compliance with all environmental
8 laws. SCE&G is committed to meeting environmental law requirements,
9 utilizing innovative and cost-effective technology to prevent pollution and
10 reduce emissions, and to support projects that foster the Company's
11 stewardship of natural resources. As the lead technical reviewer for
12 environmental matters for the Facility, I can state that this project meets
13 and will continue to meet those objectives.

14
15 **Q. PLEASE DESCRIBE THE SITE LOCATION AND THE VICINITY.**

16 A. The V.C. Summer Nuclear Station site is located in Fairfield County,
17 South Carolina, approximately 15 miles west of Winnsboro and 26 miles
18 northwest of Columbia. The site is in a sparsely populated, largely rural
19 area, with forests and small farms comprising the dominant land use. The
20 Broad River flows in a northwest-to-southeast direction approximately 1
21 mile west of the site. The general topography is low rolling hills with
22 elevations ranging from approximately 560 feet to 220 feet above MSL.

1 The site has been home to a nuclear facility since 1982, when Unit 1
2 was completed. As can be seen from Figure 2.1-1 of the Environmental
3 Report, the centerline of the new plant footprint is located approximately
4 one (1) mile southwest of the existing Unit 1 containment building, and is
5 generally the area that was used for temporary storage and staging of
6 construction materials as well as a source of borrow material during the
7 construction of Unit 1.

8 To depict the site, two figures are set forth below, namely, Figures
9 2.1-1 and 3.1-1 of the Environmental Report.

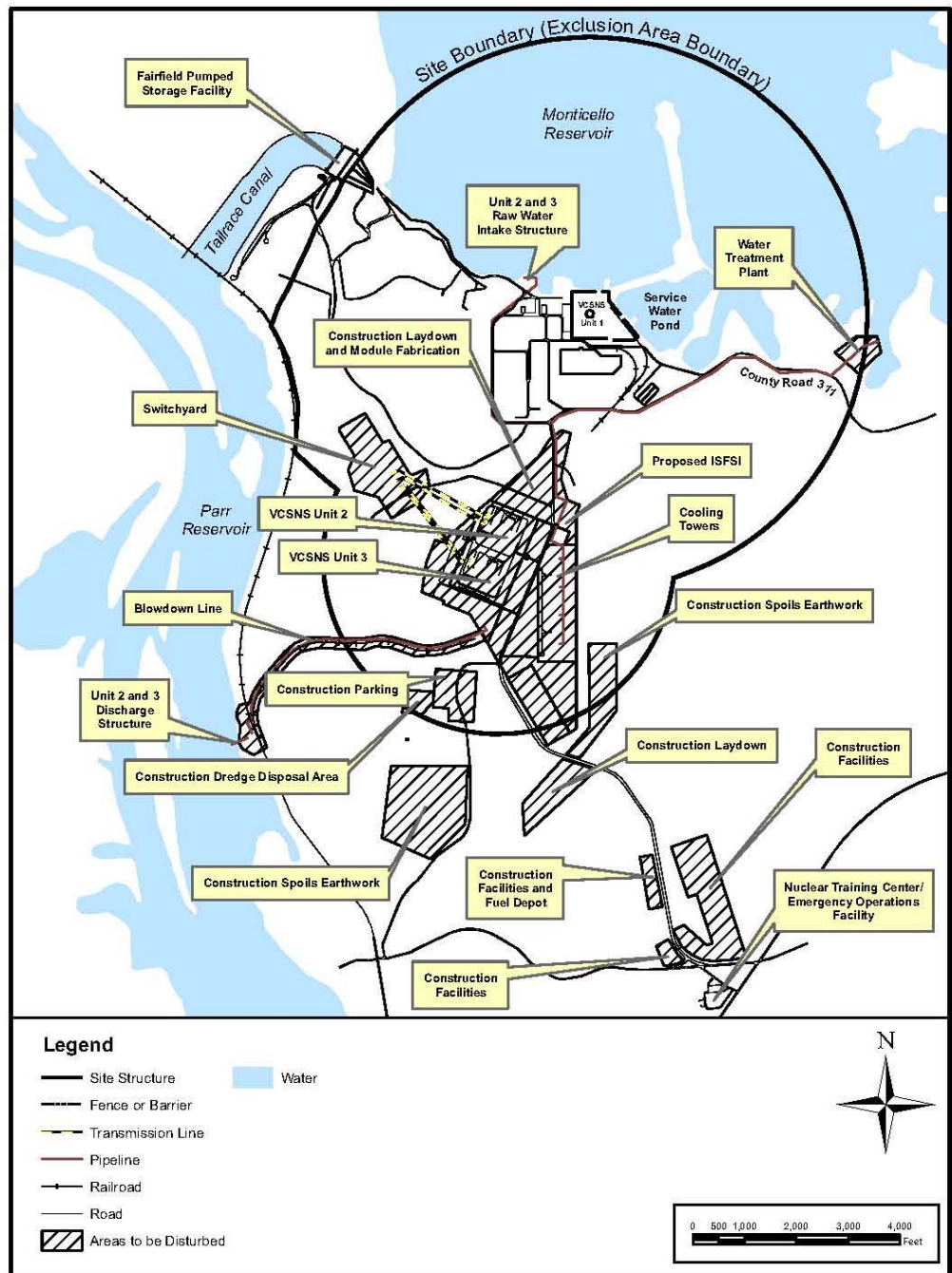


Figure 2.1-1. VCSNS Site and Proposed Plant Footprint



Figure 3.1-1. Existing VCSNS Site Photograph

Expanding an operational nuclear facility site, rather than building in a greenfield location, has enabled more confident predictions to be made concerning the environmental impacts within the surrounding area associated with constructing and operating the new Units.

The site boundary encompasses approximately 2,560 acres, the most prominent use of which has been for managing a mixed forest consisting of planted pines and second growth forests of hardwoods and mixed pine-hardwoods. No portions of the forest resources on the site qualify as virgin or near-virgin stands. An additional 1,000 acres south of the boundary has been earmarked for involvement in construction activities for the blowdown pipeline and the access road.

1 Approximately 784 acres of the site are covered by the waters of the
2 Monticello Reservoir, which will serve as the water supply for Units 2 and
3 3, just as it currently does for Unit 1. This reservoir is approximately 6
4 miles long, has a surface area of approximately 6,800 acres and a storage
5 volume of approximately 400,000 acre-feet. The 784 acre portion
6 mentioned above is that portion lying within the nuclear exclusion zone
7 associated with Unit 1 and is therefore unavailable to the public.
8 Approximately 300 acres is specifically set aside for recreational purposes,
9 although the majority of the lake is available for recreation. The Monticello
10 Reservoir also provides resting areas for wintering waterfowl and year-
11 round habitat for non-migratory Canada geese.

12 The Parr Reservoir lies to the west of the site and will receive water
13 discharges from Units 2 and 3. The Parr Reservoir provides limited
14 freshwater marsh habitat in shallow backwaters, around low-lying islands,
15 and in an area west of the Fairfield Pumped Storage Facility. These
16 marshes and adjacent shallows are used by migrating ducks.

17 There are also small streams located within the site boundary, with
18 Mayo Creek being the largest. Many of these streams may be classified as
19 “wet weather streams” that often are dry during periods of dry weather.
20 Other than the Monticello Reservoir and a few beaver ponds there are no
21 natural or man-made ponds on the site.

1 **Q. WHAT MAKES THE V.C. SUMMER NUCLEAR STATION SITE**
2 **PARTICULARLY SUITABLE FOR SITING THE PROPOSED**
3 **NUCLEAR PLANTS?**

4 A. The site has been evaluated for environmental issues and is a well-
5 studied site. For example, the site has already been through the regulatory
6 review process and deemed acceptable for the siting and location of nuclear
7 plants. Environmental monitoring and study of the site characteristics has
8 been ongoing since the mid-1970s. Prior to the current licensing of the
9 Facility, the site underwent additional evaluation as recent as 2002 during
10 the license renewal of Unit 1.

11 The site location also presents a relatively rural location that is
12 connected to the transmission grid. While additional transmission lines and
13 corridors will need to be established, the Company has already
14 demonstrated that it can effectively transmit the power generated at the site
15 location to the transmission grid.

16

17 **Q. HOW DID SCE&G EVALUTE THE ENVIRONMENTAL IMPACTS**
18 **OF THE PROJECT?**

19 A. As required, SCE&G commissioned the Environmental Report as a
20 major component of the Combined Operating License (COL) Application
21 (COLA) process. The Environmental Report contains an analysis of the
22 expected construction and operation impacts of the Facility based on

1 considerations relative to impacts on air, water, land, and fish and wildlife.
2 Further, we assessed waste management issues. This included non-
3 radiological and radiological mediums alike. The Environmental Report
4 also addresses cultural and historical resources.

5
6 **Q. IS THERE A DOCUMENT THAT SUPPORTS YOUR TESTIMONY**
7 **REGARDING EXPECTED ENVIRONMENTAL IMPACTS?**

8 A. Yes. In support of SCE&G's combined license application to the
9 NRC, an Environmental Report (ER) was prepared by consultants retained
10 by SCE&G and functioning under SCE&G's supervision. The ER was
11 submitted by SCE&G as a required part of the NRC Combined Operating
12 License Application. Copies were also provided to various federal and
13 state environmental, natural resource, and regulatory agencies. The ER is a
14 comprehensive and thorough review of the expected environmental impacts
15 from the construction and operation of the Facility. It also contains a full
16 discussion regarding the environmental impacts of considered alternatives
17 to the Facility.

18 In addition to the ER, other documents and reference materials exist
19 that support the statements and conclusions set forth in my testimony.
20 These are documents and reference materials commonly and reasonably
21 relied upon by experts in this field. These materials include for example,

1 submissions by SCE&G to regulatory agencies as well as reports and
2 correspondence from federal and state agencies.

3
4 **Q. HOW WAS THE ENVIRONMENTAL REPORT PREPARED?**

5 A. SCE&G selected Bechtel as the primary contractor for preparing the
6 COLA for the Facility. Bechtel in turn contracted with Tetra Tech NUS to
7 assist in the identification and evaluation of expected environmental
8 impacts from the construction and operation of the Facility. They
9 contracted to develop and execute a work plan to collect or develop all of
10 the information necessary for the component parts of the Environmental
11 Report, to perform or secure performance of any and all studies and report
12 preparation necessary to support component part preparation, and finally to
13 write the ER itself, all in full cooperation and consultation with SCE&G.
14 On behalf of SCE&G, based on my 30+ years of experience with nuclear
15 power environmental issues at Unit 1, with support from other key
16 members of the New Nuclear Deployment team at SCE&G, I directed and
17 supervised the research, development, and analysis of the Environmental
18 Report (ER), which is attached to the testimony of Mr. Steven Connor as
19 **Exhibit No. __ (SJC-3)**. I reviewed, oversaw, and guided, when necessary,
20 elements of the ER on behalf of the Company and provided a point of
21 contact for Bechtel and Tetra Tech NUS in preparation of the ER. I served
22 as the lead technical advisor for the ER and worked to ensure that the ER

1 was consistent with the environmental and regulatory requirements as well
2 as the governing corporate environmental policy.

3

4 **Q. WILL THE CONSTRUCTION OF THE FACILITY RESULT IN**
5 **ENVIRONMENTAL IMPACTS?**

6 A. The construction of any power generation plant, including the
7 Facility, will have some environmental impacts. However, the overall
8 impacts of the construction of the Facility are small.

9

10 **Q. HOW DO YOU DEFINE IMPACTS FOR THE ANALYSIS?**

11 A. Because the Environmental Report was prepared in conjunction with
12 the combined operating license application for NRC, it follows the
13 formatting and content requirements found in the applicable federal
14 regulations at 10 C.F.R. Part 51. Using NRC terminology and categories
15 from other environmental assessments of nuclear facilities, impacts are
16 analyzed and defined on a significance level of small, moderate, or large.

17 These are defined as follows:

18 SMALL Environmental effects are not detectable or
19 are so minor that they will neither
20 destabilize nor noticeably alter any
21 important attribute of the resource.

22

23 MODERATE Environmental effects are sufficient to alter
24 noticeably, but not to destabilize, any
25 important attribute of the resource.

26

1 LARGE Environmental effects are clearly noticeable
2 and are sufficient to destabilize any
3 important attributes of the resource.
4
5 I use those terms similarly in describing the environmental impacts of the
6 Facility.

7

8 **Q. COULD YOU PLEASE DESCRIBE IN GENERAL TERMS THE**
9 **PRECONSTRUCTION AND CONSTRUCTION ACTIVITIES**
10 **RELATED TO THE FACILITY?**

11 A. The preconstruction activities will include such things as site
12 exploration, site clearing and grading, installation of stormwater and
13 erosion control devices, erection of fences and access control measures,
14 excavation, erection of support buildings such as workshops, and the
15 installation of infrastructure such as additional utility lines. These
16 preconstruction activities are described in the ER in Section 1.2.2.

17 The construction activities involve the construction of the nuclear
18 plant itself and its directly associated safety-related facilities, such as
19 supporting infrastructure. This includes, for example, the construction of
20 the reactor containment structure and turbine building. These construction
21 activities and the associated environmental effects are described in the
22 Environmental Report in Section 4.

23

1 **Q. WHAT ENVIRONMENTAL PERMITS OR APPROVALS WILL BE**
2 **REQUIRED TO CONSTRUCT THE FACILITY?**

3 A. SCE&G will be required to acquire environment-related permits and
4 approvals from a number of federal and state permitting/licensing agencies,
5 as well as subject its plans to review and comment relating to
6 environmental issues by federal and state resource management agencies.
7 The permitting and comment processes will relate both to the Facility's
8 construction and operation. The approvals, permits, and authorizations
9 required for preconstruction and construction activity can be found in
10 Tables 1.2-2 and 1.2-3 of the Environmental Report, which I have attached
11 to my testimony as **Exhibit No.__(SES-1)**.

12 In general, SCE&G will need approvals from federal and state
13 agencies before and during the construction of the Facility. For example,
14 the overall project requires approval from both the NRC and this
15 Commission. Various subparts of the project will require separate permits
16 and approvals. Several permits will be required from DHEC. These
17 include permits related to air emissions, water discharges, and waste
18 management. The permits are issued on a medium basis, i.e. air, water, and
19 land. Thorough evaluations of fish and wildlife impacts and other
20 considerations are also reviewed and assessed, although specific permits or
21 approvals will likely not be required. A U.S. Army Corps of Engineers'
22 (Corps) permit will be required for the minimal wetland impact and

1 potentially for impacts in Parr and Monticello Reservoirs expected from
2 construction. Certain construction activities will also require approval and
3 authorization from FERC.

4
5 **Q. PLEASE DESCRIBE THE ANTICIPATED ENVIRONMENTAL**
6 **IMPACTS OF THE CONSTRUCTION OF THE PROPOSED**
7 **FACILITY ON AIR QUALITY.**

8 A. Air emissions from construction activities result from two primary
9 sources. First, the construction equipment and a concrete batch plant to be
10 built on-site will produce small, though quantifiable, air emissions.
11 SCE&G will need to obtain a permit for the construction and operation of
12 the concrete batch plant. It will not be considered a major source for air
13 emissions.

14 Additionally, fugitive air emissions, such as dust and dirt, will arise
15 because of construction activities generally, such as truck traffic on dirt
16 roads and the conveyance of materials. SCE&G will mitigate these
17 emissions through the implementation of “best management practices”
18 during the construction process. For example, a dust control plan and
19 mitigation measures will be developed before construction and will be
20 implemented during the construction phase. That plan will specify
21 measures to mitigate fugitive emissions from the construction process. It

1 may call for something as simple as operating a watering truck, or require
2 more sophisticated processes in some circumstances.

3 The air emissions during the construction stage will be both
4 temporary and minor. Air quality considerations associated with the
5 construction of the Facility mainly are addressed in Section 4.4.1.3 of the
6 Environmental Report.

7
8 **Q. PLEASE DESCRIBE THE ANTICIPATED ENVIRONMENTAL**
9 **IMPACTS OF THE CONSTRUCTION OF THE PROPOSED**
10 **FACILITY ON WATER QUALITY.**

11 A. Water quality impacts are expected to be minimal during the
12 construction phase. Construction activities will require stormwater permits
13 for different phases of the construction process when land disturbance will
14 occur. To obtain these stormwater permits from DHEC, SCE&G will
15 develop stormwater pollution prevention plans for approval by DHEC that
16 will implement “best management practices.”

17 The Corps may require a permit for construction activities in Parr
18 and/or Monticello Reservoirs related to the intake and discharge structures.
19 In that case, DHEC would address water quality of those activities through
20 the 401 water quality certification process which would be conducted
21 jointly with the Corps’ permitting process.

1 Each of these permits will set forth standards and conditions to
2 ensure water quality standards are maintained.

3 Water quality impacts are discussed in detail in Sections 4.2 and 4.3
4 of the Environmental Report.

5
6 **Q. WILL ANY WETLANDS BE FILLED?**

7 A. Yes. As I previously noted, less than one (1) acre of wetlands will
8 be filled. A permit to fill that area will be acquired from the U.S. Army
9 Corps of Engineers. A permit is necessary not because of the area of
10 wetlands to be filled, but because over 300 linear feet of stream will be
11 impacted. SCE&G will provide mitigation for the filling of the wetland
12 area as required by the Corps. Before that permit can be issued, DHEC
13 must have issued a certification that the filling of the wetland will not
14 adversely impact water quality. SCE&G will develop plans to ensure that
15 water quality will not be adversely impacted by filling of the wetland.

16
17 **Q. PLEASE DESCRIBE THE ANTICIPATED WATER USE DURING**
18 **THE CONSTRUCTION OF THE PROPOSED FACILITY.**

19 A. A relatively small amount of water may be withdrawn from the
20 Monticello and/or Parr Reservoir for use during construction activities.
21 Initially, the supply of water for construction needs will come from the
22 Jenkinsville water system. Since part of the overall project will involve

1 constructing a water treatment plant to meet all operating needs for the
2 Facility, it is possible that prior to Facility operation, the water supply will
3 cease coming from Jenkinsville and instead come from the water treatment
4 plant. In any case, the impact on water quantity and flow rates associated
5 with construction will be negligible.

6
7 **Q. PLEASE DESCRIBE THE ANTICIPATED ENVIRONMENTAL**
8 **IMPACTS OF THE CONSTRUCTION OF THE PROPOSED**
9 **FACILITY ON SOLID WASTE MANAGEMENT.**

10 A. Construction activities generate solid waste. Most debris from
11 construction activities will be deposited in a permitted landfill or disposed
12 of utilizing another acceptable disposal method or facility. This may be an
13 on-site construction and demolition landfill for which SCE&G would
14 receive a permit, or a permitted, offsite landfill in the area. To the extent
15 scrap metal, aluminum, batteries, or other materials may be recycled,
16 SCE&G plans to take reasonable steps to recycle those materials.

17
18 **Q. PLEASE DESCRIBE THE ANTICIPATED IMPACTS OF THE**
19 **CONSTRUCTION OF THE FACILITY ON FISH AND WILDLIFE.**

20 A. There will be some impact to habitat for existing wildlife due to the
21 land clearing activities necessary for the construction of the Facility.
22 However, given the fact that approximately 500 acres of affected habitat at

1 the site represents a small portion of the available, undeveloped land in the
2 vicinity, the construction-related impacts on wildlife should be minimal to
3 wildlife populations in the vicinity. In fact, post-construction activities may
4 include revegetation of certain affected areas that will restore those areas.
5 In short, the construction is expected to have a minimal impact on fish and
6 wildlife.

7
8 **Q. WILL THERE BE AN IMPACT ON ANY PLANTS?**

9 A. There will be some degree of impact on plant life due to land
10 clearing. The construction activities for the Facility will not reduce the
11 local diversity of plants or plant communities and would not impact
12 endangered or threatened species.

13
14 **Q. WHAT OTHER ENVIRONMENTAL CONSIDERATIONS WERE**
15 **TAKEN INTO ACCOUNT IN ASSESSING THE CONSTRUCTION**
16 **OF THE FACILITY?**

17 A. One of the benefits of constructing the Facility on the site of an
18 existing nuclear plant is that the site has already been determined to be
19 acceptable from an environmental perspective. This was reconfirmed
20 during the 2002 environmental report prepared for the license renewal of
21 Unit 1.

1 Another consideration was the increased traffic generated by the
2 construction. As with any traffic increase, the numbers of additional trucks
3 and cars on the road will produce additional emissions during the
4 construction period. However, the largest impact from the traffic is the
5 effect on traffic flow, which will have some indirect environmental
6 consequence. To mitigate the impact from additional traffic, SCE&G will
7 adopt mitigation measures, such as the implementation of a construction
8 management traffic plan, to minimize any impact. SCE&G expects to
9 coordinate closely with the SCDOT to address the traffic flow and safety
10 issues. The traffic impact is discussed in the Environmental Report at
11 Section 4.4.2.2.4.

12 As demonstrated in Tables 4.5-2 and 4.5-3 of the Environmental
13 Report, the total exposure of construction workers to radiation will be well
14 below the regulatory limits.
15

16 **Q. WILL THE FACILITY COMPLY WITH CURRENT LOCAL LAND**
17 **USE REQUIREMENTS?**

18 A. Yes. The Facility will comply with any applicable zoning and land
19 use development ordinances.
20

1 **Q. WILL THE CONSTRUCTION OF THE PROPOSED FACILITY**
2 **CONFORM TO APPLICABLE FEDERAL, STATE, AND LOCAL**
3 **ENVIRONMENTAL LAWS?**

4 A. Yes. The construction planning process is designed to ensure that
5 SCE&G complies with applicable environmental laws during the
6 construction of the Facility. SCE&G is committed to complying with its
7 legal obligations under applicable environmental laws. The Company has
8 developed and implements a corporate environmental policy aimed at
9 ensuring good stewardship of natural resources and preventing pollution to
10 the extent reasonably and economically achievable. The Company
11 continually seeks ways to improve its practices and technologies in an
12 environmentally friendly manner.

13 SCE&G will implement a number of measures and controls to limit
14 impacts on the environment during construction of the project. These are
15 presented in Table 4.6-1 and discussed in Section 4.6 of the Environmental
16 Report.

17
18 **Q. IN YOUR EXPERT OPINION, HOW WOULD YOU**
19 **CHARACTERIZE THE ENVIRONMENTAL IMPACTS FROM THE**
20 **CONSTRUCTION OF THE FACILITY?**

1 A. Overall, the construction impacts of the Facility on the environment
2 are small. The construction-related environmental impacts and mitigation
3 measures are summarized in the Environmental Report at Table 10.1-1.
4

5 **Q. ONCE CONSTRUCTED, FROM AN ENVIRONMENTAL**
6 **PERSPECTIVE, WHAT IMPACTS WILL RESULT FROM THE**
7 **OPERATION OF THE FACILITY?**

8 A. The impacts from the operation of the Facility will be similar to the
9 impacts of the operation of Unit 1 at the site. There will be limited air
10 emissions and only a minimal discharge of effluent into Parr Reservoir,
11 which should have little noticeable impact on downstream users. The
12 cooling towers associated with Units 2 and 3 will evaporate water from
13 Monticello Reservoir, but should not have detrimental effects on critical
14 low-flow conditions in the Broad River. Non-radioactive and radioactive
15 waste will increase but remain below the regulatory limits. Solid waste will
16 be handled in a similar manner to solid waste from Unit 1.

17 The ER contains a summary of environmental impacts, mitigation
18 measures (to the extent an impact warrants mitigation), and the resulting
19 environmental consequence after the impact has been mitigated at Table
20 10.1-2, which is attached to my testimony as **Exhibit No.__(SES-2)**.
21

1 **Q. WHAT ENVIRONMENTAL PERMITS OR APPROVALS WILL BE**
2 **REQUIRED FOR FACILITY OPERATION?**

3 A. To operate, the Facility requires approval from NRC. This
4 comprehensive license will mandate stringent controls for radioactive
5 environmental discharges and emissions and require licensee compliance
6 with the permit obligations for environmental controls for non-radiological
7 discharges and emissions. Additional approvals are required for the
8 transportation and possession of nuclear materials. As it did for Unit 1,
9 SCE&G will seek FERC authorization to withdraw water from Monticello
10 Reservoir to support Units 2 and 3 operations.

11 SCE&G will need to acquire several state authorizations for
12 operation as well. These include the revision of existing permits associated
13 with Unit 1, such as the wastewater discharge permit, the conditional major
14 air operating permit, and radioactive waste transport permit. Other
15 approvals include registration and reporting of surface water withdrawal,
16 obtaining authorization for stormwater discharges associated with industrial
17 activity, and a radioactive materials license.

18 The authorizations and approvals generally required before the
19 Facility can begin operating are listed in Table 1.2-4 of the Environmental
20 Report, which is attached to my testimony as **Exhibit No.__(SES-3)**.

21

1 **Q. PLEASE DESCRIBE THE IMPACT OF THE OPERATION OF THE**
2 **PROPOSED FACILITY ON AIR QUALITY.**

3 A. The air emissions from operation of the Facility will be minimal,
4 especially in comparison to other means of base load power generation.
5 The Environmental Report sets forth a chart in Table 10.4-1 that provides a
6 comparison of the air emissions of criteria pollutants from other methods of
7 base load generation. Nuclear generation, such as the Facility, is clearly
8 superior in terms of minimizing greenhouse gas and criteria pollutant air
9 emissions during operations.

10 The air emissions anticipated from the operation of the Facility are
11 those associated with any emergency generation on-site and minimal
12 amounts of gaseous radioactive emissions. The emergency generation
13 equipment is expected to operate less than 250 hours per year. These
14 emissions render the equipment minor air emissions sources and therefore
15 have a *de minimis* impact on air quality. The air quality impacts from
16 operation of the Facility are described in Section 5.5.1.3 of the
17 Environmental Report. The gaseous radioactive emissions will be within
18 regulatory limits.

19

20 **Q. PLEASE DESCRIBE THE ANTICIPATED ENVIRONMENTAL**
21 **IMPACTS OF THE OPERATION OF THE PROPOSED FACILITY**
22 **ON WATER QUALITY.**

1 A. The Facility will use water from the Monticello Reservoir for its
2 cooling system and plant operations. A water treatment plant will also be
3 located at the site. Wastewater discharges to Parr Reservoir will include
4 cooling tower blowdown (which is treated cooling water discharged to
5 prevent the buildup of solids and salts), permitted wastewater from
6 auxiliary systems, treated sanitary wastewater, and stormwater runoff.

7 Discharges will be subject to water quality standards and discharge
8 permits issued by DHEC. Almost all of the wastewater will be discharged
9 through a single discharge point into the Parr Reservoir. The discharge
10 system is discussed in the Environmental Report in Section 5.3.2. There
11 will be a small discharge from the water treatment facility back to the
12 Monticello Reservoir.

13 The effluent streams will be mixed. The vast majority of the effluent
14 will be made up of cooling tower blowdown. Because the blowdown
15 stream will be extremely small relative to the flow of the Broad River,
16 concentrations of solids and chemicals used in cooling tower water
17 treatment will return to ambient levels almost immediately downstream of
18 the discharge pipe.

19 The water quality impacts from operation of the Facility are
20 described in Sections 5.2, 5.3, and 5.5.1.1 of the Environmental Report. In
21 accordance with its permits, SCE&G will monitor and report the effluent

1 discharge levels to ensure that all applicable water quality standards will be
2 met.

3
4 **Q. PLEASE DESCRIBE THE ANTICIPATED ENVIRONMENTAL**
5 **IMPACTS OF THE OPERATION OF THE PROPOSED FACILITY**
6 **ON WATER QUANTITY.**

7 A. No impacts will be expected to groundwater quantity because
8 groundwater will not be withdrawn for operational use by Units 2 and 3.
9 Instead, SCE&G will use surface water of approximately 83 cubic feet per
10 second (cfs) during normal operations. Of the total surface water
11 withdrawn, approximately 81 cfs will be withdrawn to provide makeup
12 water to the circulating water system during normal operations.
13 Approximately 21 cfs will be returned to the reservoir, most of which is
14 blowdown from the cooling towers. Water for the water treatment facility
15 will be withdrawn for Unit 2 and 3 uses at an approximate rate of 2.2 cfs
16 during normal operations. Additional water withdrawn will supply other
17 plant uses, including potable water.

18 Figures 3.3-1 and 5.2-1 of the Environmental Report, copies of
19 which are attached to the testimony as **Exhibit No. __ (SES-4)**, provides
20 diagrams of the water use at the Facility.

1 **Q. WHAT IS A 7Q10 FLOW AND HOW DO THE UNITS 2 AND 3**
2 **FLOW RATES COMPARE WITH THE 7Q10 FLOW?**

3 A. The 7Q10 is a standard measurement representing low flow
4 conditions. It is measured by calculating seven-day, consecutive low flow
5 with a ten year return frequency. In other words, it is the lowest stream
6 flow for seven consecutive days that would be expected to occur once in ten
7 years.

8 The 7Q10 for the Broad River downstream of the Facility at the
9 Alston USGS gauge calculated in March 2007 is 853 cfs. The normal
10 water use during normal operations of the Facility, which is approximately
11 83 cfs, of which a portion is returned to the Broad River, represents less
12 than 10% of the 7Q10 flow.

13

14 **Q. WILL WATER REMOVED FROM THE MONTICELLO**
15 **RESERVOIR FOR USE AT THE FACILITY BE RETURNED TO**
16 **THE RIVER FOR DOWNSTREAM USERS?**

17 A. Yes, less consumptive losses. Due to consumptive losses, the
18 volume of water returned to Parr and Monticello will be less than the
19 volume of water withdrawn. These consumptive losses are largely
20 attributable to evaporation. Normal consumptive losses will be about 62
21 cfs. Consumptive losses under normal circumstances will be barely
22 discernible in the Broad River flow. Importantly, water discharged to the

1 Parr Reservoir is not lost to downstream users or downstream aquatic
2 communities. During extreme low-flow periods, SCE&G could limit or
3 even cease withdrawal of water from the Parr Reservoir, allowing all net
4 inflow into Parr (minus evaporation from the surface of the reservoir) to
5 pass downstream for the benefit of downstream users. While this would
6 represent an absolute worst case scenario, even in that circumstance, all
7 three nuclear units could continue to operate for approximately two and
8 one-half (2½) months with water stored in Monticello Reservoir.

9
10 **Q. ARE LIMITS ALREADY IN PLACE BY FERC TO PROTECT**
11 **DOWNSTREAM FLOW?**

12 A. Yes. Due to the hydropower facilities and the associated Monticello
13 and Parr Reservoirs, SCE&G has a license issued by FERC that indirectly
14 places limits on the use of water by the Facility. The FERC license
15 provides that a minimum flow continue downstream. Assuming that the
16 FERC flow rate minimum remains constant, there will be no change to the
17 minimum flow rate of the Broad River downstream of the Site due to the
18 operations of Units 2 and 3.

19
20 **Q. HOW WILL DROUGHT SITUATIONS IMPACT THE FACILITY?**

21 A. The water consumption situation presented at the V.C. Summer
22 Nuclear Station site is significantly better than at some other sites because

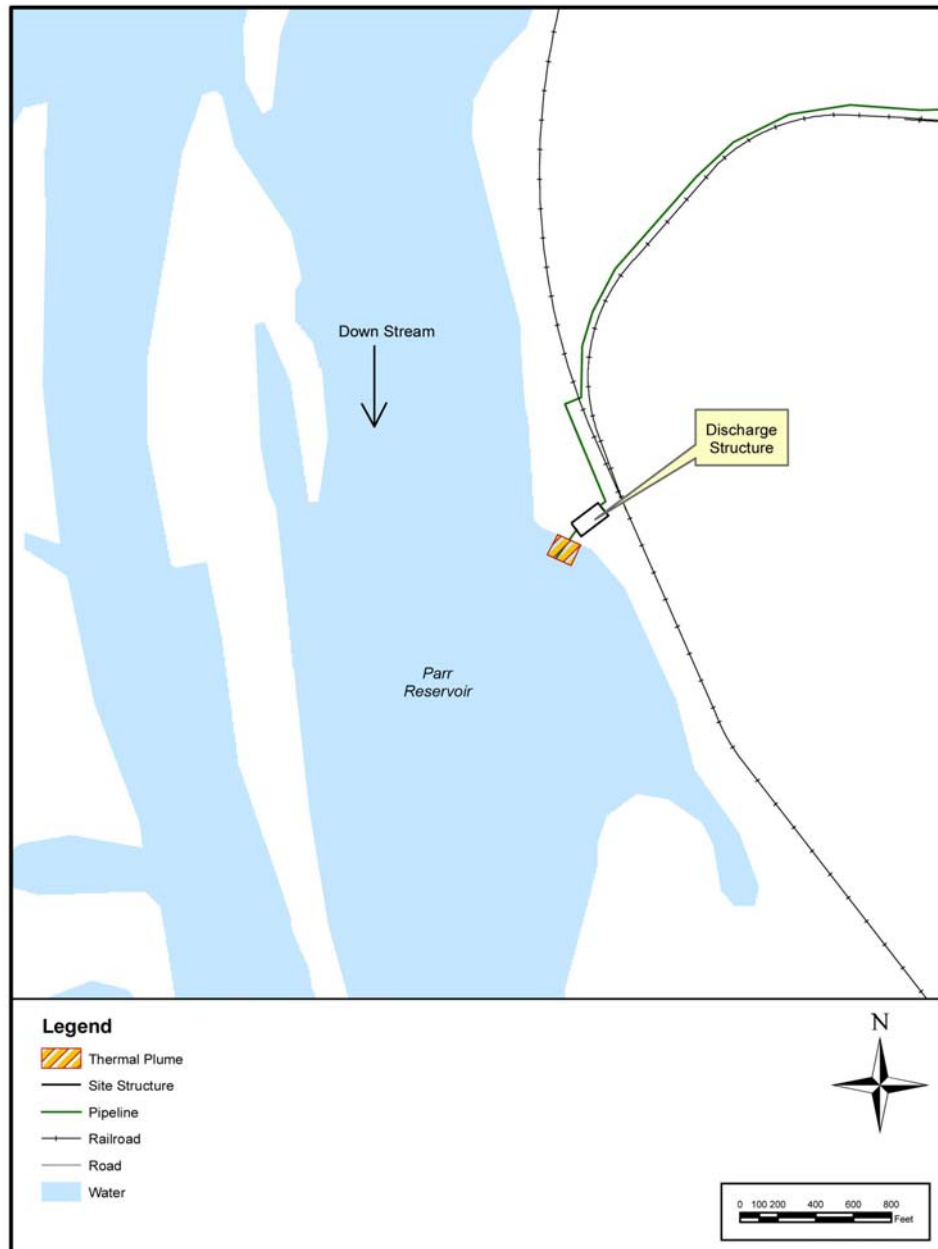
1 of the availability of Monticello Reservoir. This reservoir gives SCE&G
2 the capability of operating the Facility without impacting the downstream
3 flow of the Broad River. In fact, during drought periods, SCE&G could
4 theoretically operate all three units for up to 118 days (76 days of normal
5 operations and 42 additional days with FERC approval) at full capacity on
6 the water resources offered by the Monticello Reservoir without affecting
7 downstream flow.

8
9 **Q. PLEASE DESCRIBE THE ANTICIPATED IMPACTS OF THE**
10 **OPERATION OF THE PROPOSED FACILITY ON FISH AND**
11 **WILDLIFE.**

12 A. The intake system for Units 2 and 3 is designed to mitigate impacts
13 on fish and aquatic life, utilizing low intake velocities and flow rates that
14 minimize impacts to fish and shellfish. Using conservative estimates and
15 data from impingement and entrainment of fish for the Unit 1 intake, the
16 evidence is clear that the danger of impingement by the intake system is
17 small.

18 Another potential source of impact on fish and aquatic life in the
19 Parr Reservoir is from the discharge of heated effluent. When evaluated,
20 however, only a small portion of the Parr Reservoir in the immediate area
21 of the discharge structure might be affected. With the relatively small
22 thermal plume, most of the reservoir remains unaffected and the plume

1 would not create a barrier to upstream or downstream movement of fish.
2 Figure 5.3-4 of the ER, a copy of which is set forth below, depicts the
3 thermal plume.



4 **Figure 5.3-4. Plan View of the Thermal Plume in Parr Reservoir**

1 In summary, the operations of the Facility will have minimal impact
2 on wildlife.

3
4 **Q. PLEASE DESCRIBE THE ANTICIPATED ENVIRONMENTAL**
5 **IMPACTS AND EFFECTS OF NON-RADIOACTIVE SOLID**
6 **WASTE CREATED BY THE OPERATION OF THE PROPOSED**
7 **FACILITY.**

8 A. The operation of two additional reactors will increase the volume of
9 solid waste. SCE&G anticipates an additional 800 personnel will be
10 needed to operate the Facility. However, the characteristics of the
11 wastestreams will not change, allowing the current practices to be adopted
12 for the new units as well. SCE&G's existing waste minimization plan for
13 Unit 1 will be expanded to include Units 2 and 3, and the waste
14 management practices utilized for Unit 1 will also govern Units 2 and 3.

15 The associated non-radioactive solid waste impacts from operation
16 of the Facility are described in Section 5.5.1.2 of the Environmental Report.

17
18 **Q. HOW WILL RADIOACTIVE WASTE BE HANDLED AND**
19 **DISPOSED OF?**

20 A. Generally, the procedures and disposal methods that are currently
21 utilized for the disposal of radioactive waste from Unit 1 will also be

1 utilized for Units 2 and 3. Those radioactive waste management practices
2 are discussed in the Environmental Report in Section 3.5.

3 Low-level radioactive waste is stored on-site on an interim basis
4 before being shipped to a permanent disposal facility. SCE&G has
5 contracts with two such permanent disposal sites – one in Tennessee and
6 one in Barnwell, South Carolina. There will be no significant radioactive
7 releases from radioactive waste associated with the Facility.

8 The spent fuel will be held on-site in a fuel pool for a period of time.
9 Spent fuel may be placed in dry fuel storage at a later date or otherwise
10 disposed of per DOE's instructions. The spent fuel can be safely
11 maintained on site virtually indefinitely, if necessary.

12 The Environmental Report discusses the disposal of radioactive
13 waste in Sections 5.5.4 and 5.7.

14 Transportation of radioactive wastes is also considered. There are
15 stringent controls on moving radioactive waste from one location to another
16 and incident-free transportation is the goal, which has been achieved in
17 transporting Unit 1 waste. The ER discusses the practices and procedures
18 in detail in Section 5.11.

19

20 **Q. WHAT STEPS WILL SCE&G TAKE TO MONITOR**
21 **ENVIRONMENTAL COMPLIANCE AND MINIMIZE THE**

1 **ENVIRONMENTAL CONSEQUENCES OF THE CONSTRUCTION**
2 **AND OPERATION OF THE FACILITY?**

3 A. A construction environmental controls plan will be implemented
4 which contains descriptions of the environmental management controls that
5 will be used on the site to assist in meeting the overall environmental
6 management objectives for the project. The plan will ensure the project
7 complies with applicable local, state, and federal ordinances, laws, and
8 regulations intended to prevent or minimize the environmental impacts of
9 construction activities on air, water, land, and people. It will also ensure
10 compliance with existing permits and licenses for Unit 1, as well as
11 procedures and processes applicable to construction projects.

12 To put the plan into action, mandatory environmental awareness
13 training will be required before all construction personnel, including
14 subcontractor employees, are allowed to work onsite. Periodic site
15 environmental compliance reviews and coordination meetings between site
16 project personnel will be conducted to discuss current and future
17 construction work activities as they relate to maintaining environmental
18 compliance, with regular inspections of construction activities being
19 performed to confirm that site activities remain in compliance with all
20 applicable environmental requirements. These items are described in
21 more detail in Section 4.6 of the Environmental Report. Environmental
22 impacts of operating the Facility will be limited through compliance with

1 applicable laws intended to prevent or minimize environmental effects.
2 The operations of the Facility will be conducted according to the
3 specifications within the numerous licenses and permits required, and those
4 approvals carry extensive monitoring and reporting requirements.

5 SCE&G will be responsible for conducting non-radiological,
6 radiological, hydrological, chemical, air, water quality, and waste disposal
7 monitoring programs to ensure that the operations of the Facility continue
8 to comply with all environmental permits, licenses and regulations.

9 For example, the water discharge and air quality permits issued by
10 DHEC require monitoring and reporting activities. SCE&G will be
11 responsible for providing DHEC with periodic monitoring reports in the
12 same general manner as it currently does for Unit 1. Additionally, the NRC
13 has stringent requirements for monitoring and reporting which will be met.
14 In summary, the operations of the Facility will be subjected to significant
15 monitoring and reporting requirements by federal and state agencies.

16

17 **Q. WILL THE OPERATION OF THE PROPOSED FACILITY**
18 **CONFORM TO APPLICABLE FEDERAL, STATE, AND LOCAL**
19 **ENVIRONMENTAL AND LAND USE LAWS?**

20 A. Based on our extensive evaluation, analysis, and experience at the
21 V.C. Summer Nuclear Station site, it is my expert opinion that the

operations of the Facility will meet the applicable requirements of environmental laws and governing permits.

Q. PLEASE CHARACTERIZE THE ENVIRONMENTAL IMPACTS ON THE V.C. SUMMER NUCLEAR STATION SITE AND SURROUNDING AREA FROM THE OPERATION OF THE FACILITY.

A. Overall, the operating impacts of the Facility on the environment are small. As reflected in the Environmental Report, the impacts can be summarized in the following chart:

| <u>Category</u> | <u>Environmental Impact</u> |
|-----------------------------------|-----------------------------|
| Land Use | Small |
| Air Quality | Small |
| Water Quality | Small |
| Water Quantity and Use | Small |
| Terrestrial Ecosystems | Small |
| Aquatic Ecosystems | Small |
| Threatened and Endangered Species | Small |
| Historic and Cultural Resources | Small |
| Transportation | Small to Moderate |

1 As previously explained, a “small” impact is defined as one for which the
2 environmental effects are not detectable or are so minor that they will
3 neither destabilize nor noticeably alter any important attribute of the
4 resource. The operation-related environmental impacts and mitigation
5 measures are summarized in the Environmental Report at Table 10.1-2.

6
7 **Q. IN YOUR EXPERT OPINION, WHAT IS THE OVERALL**
8 **ENVIRONMENTAL IMPACT OF THE CONSTRUCTION AND**
9 **OPERATION OF THE FACILITY?**

10 A. Emissions from the construction and operation of the Facility will be
11 minor. The Facility will have only a small impact on fish and wildlife and
12 a small impact on water quantity. Moreover, nuclear energy has the least
13 amount of impact on air and water quality when compared to the other
14 alternatives for providing equivalent base load capacity. In summary, in
15 my expert opinion, the overall impact of the Facility on the environment is
16 small and within the limits required by environmental laws.

17
18 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

19 A. Yes.